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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,923	03/30/2001	Matthew E. Frazer	PW 027 3217 P10862	8276

27496 7590 12/22/2004

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EXAMINER	
WANG, JIN CHENG	

ART UNIT	PAPER NUMBER
2672	

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/822,923	Applicant(s) FRAZER ET AL.	
	Examiner Jin-Cheng Wang	Art Unit 2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2004*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Finality of Last Office Action

On December 7, 2004, Applicant had an interview with the Examiner regarding the finality of the last Office action dated 06/22/2004 after a request for continuing examination on 06/08/2004. After further review, the Examiner concludes that applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Amendment

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the Office action dated 02/03/2004 has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/08/2004 has been entered. Claims 1-28 have been canceled. Claims 29-52 have been newly added. Claims 29-52 are pending in the application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 29-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bradski et al. U.S. Pat. No. 6,363,160 (hereinafter Bradski).

3. Claim 29:

(a) Bradski teaches a method of calibrating a computer-vision system to track a selected object through a series of frames of data, comprising:

Displaying an image frame from an image input device, said image frame including a calibration rectangle (figure 1; column 3, lines 34-55; column 7, lines 55-65; figure 11; column 4, lines 2-60; column 15, lines 13-58; figures 4, 10A and 10B);

Converting the image frame from red-green-blue pixel information to a hue saturation value (HSV) array of pixels (e.g., column 4);

Thresholding the HSV array of pixels to create a thresholded HSV array of pixels (column 4);

Establishing an initial test window in the thresholded HSV array of pixels to create an initial test HSV array of pixels (Bradski teaches a calculation region which can be the entire video frame having a shape of a rectangle and is used for tracking in video sequences. The search windows of Bradski can be made the same size as the entire video frame or window wherein the test video frames are shown in *successive* frames in video sequences in Figures 14A-14E and the image within one of the boxes is selected. The search windows of Bradski are the test video frames or test video windows as shown in successive frames or windows and some are adjacent to each other in video sequences).

(b) Bradski is silent on the claim limitation of "determining a mean saturation of the initial test HSV array of pixels; determining if the mean saturation of the initial test HSV array of pixels falls within a first predetermined range; determining if a standard deviation of saturation of the initial test HSV array of pixels is less than a first predetermined amount if the mean saturation of initial test HSV array of pixels falls within the first predetermined range" and

"determining a mean hue of the initial test HSV array of pixels if the standard deviation of the saturation of the initial test HSV array of pixels is less than the first predetermined amount, and determining a standard deviation of hue of the initial test HSV array of pixels if the mean hue of the initial HSV array of pixels falls within a second predetermined range."

(c) However, Bradski teaches a standard mean shift method to track objects that have been converted into probability distributions to determine if the search was moved by a value <u>less than a preset threshould value</u> (column 4-5). Bradski teaches determining window sizing parameters for a set of search windows or boxes or windows of FIG. 14A displaying images (column 5, lines 52-67; column 6, lines 1-44; column 15, lines 13-58), each of the moving search windows having a same shape and a same pixel size (e.g., column 7; column 14-15) as the calibration region in a form of rectangle or a search window (column 7, lines 5-55; column 15, lines 13-58), wherein tracking data, to track the selected gestures is selected from one of the calculation region and the search windows having a <u>highest tracking probability</u>. For example, Bradski teaches that the tracking data such as window location parameters are determined/adjusted and a search window having the largest connected region of a probability distribution and the <u>greatest probability density</u> is selected (column 6, lines 45-67; column 7, lines 55-67; column 8, lines 1-9; column 15, lines 13-58) and each of the adjacent test windows

share at least one pixel with the calibration rectangle (e.g., column 7, lines 5-55; column 15, lines 13-58).

Bradski further discloses a Gaussian or Chi-Square hue probability distribution which involves the mean hue or the standard deviation of the hue and search for the area with the greatest probability density involves the motion-tracking processing suggesting the mean hue or the standard deviation of the hue being less than predetermined levels wherein the small mean saturation and a small standard deviation of a saturation or hue of the pixels in a Gaussian or Chi-Square probability density results in the optimum tracking accuracy (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 1-63, and column 6, lines 22-44; column 8, lines 10-38; column 12, lines 1-67). Therefore, Bradski teaches the claim limitation relating to the selection of a test HSV array of pixels by comparing the hue and saturation mean and standard deviations with the predetermined parameter values.

(d) It would have been obvious to one of ordinary skill in the art to have used the optimum ranges for the mean and standard deviation of the hue or saturation to obtain the optimum tracking accuracy or minimum tracking errors because Bradski teaches performing pattern recognition based on Gaussian and Chi-square distributions to determine a best match for the tracked object because such a selection of optimum ranges yields the best match tracking object based on the probability distribution or probability density.

(e) One having the ordinary skill in the art would have been motivated to do this because it would have provided a routine experimentation with the optimum ranges and criteria based on some specific parameters of the probability distributions to obtain the greatest probability density

for object selection to find the best match tracking object. See In re Peterson, 65 USPQ2d 1379 (CA FC 2003) and In re Geisler (CA FC) 43 USPQ2d 1362.

Claims 30-34:

The claim 30-34 encompasses the same scope of invention as that of claim 29 except additional claimed limitation of "a next test window". However, Bradski further discloses the claimed limitation of "a next test window" (a set of search windows or boxes or windows of FIG. 14A).

Claim 35-40:

The claims 35-40 is related to the selection of the best match tracking-object based on a set of test windows. The claims are subject to the same rationale of rejections set forth in the claims 29-34.

Claims 41-52:

(a) The claim 41-52 encompasses the same scope of invention as that of claim 29-40 except additional claimed limitation of "a machine-readable medium having recorded thereon instructions".

(b) Bradski has taught a method of calibrating a computer-vision system to track a selected object through a series of frames of data.

(c) Bradski however does not particularly disclose a recording medium having recorded thereon instructions.

(d) However, one of ordinary skill in the art would have recognized that computer readable medium (i.e., floppy, cd-rom, etc.) carrying computer-executable instructions for implementing a method, because it would facilitate the transporting and installing of the method on other systems, is generally well-known in the art. For example, a copy of the Microsoft Windows operating system can be found on a cd-rom from which Windows can be installed onto other systems, which is a lot easier than running a long cable or hand typing the software onto another system. The Office takes Official Notice of this teaching.

(e) Therefore, it would have been obvious to implement the Bradski's method and put Bradski's program on a computer readable medium, because it would facilitate the transporting, installing and implementing of Bradski's program on other systems.

Remarks

4. Applicant's arguments, filed 06/08/2004, have been fully considered but they are not deemed to be persuasive.

5. In Remarks, Applicant argues in essence with respect to claim 29 and similar claims that:

(A) "...the Bradski reference does not disclose, teach, or suggest 1) "determining a mean saturation of the initial test HSV array of pixels; 2) determining if the mean saturation of the initial test HSV array of pixels falls within a first predetermined range; determining if a standard deviation of saturation of the initial test HSV array of pixels is less than a first

predetermined amount if the mean saturation of initial test HSV array of pixels falls within the first predetermined range."

In response to the arguments in (A), the Examiner asserts that Bradski at least suggests the claim limitation.

Bradski teaches a standard mean shift method to track objects that have been converted into probability distributions to determine if the search was moved by a value less than a preset threshould value (column 4-5). Bradski teaches determining window sizing parameters for a set of search windows or boxes or windows of FIG. 14A displaying images (column 5, lines 52-67; column 6, lines 1-44; column 15, lines 13-58), each of the moving search windows having a same shape and a same pixel size (e.g., column 7; column 14-15) as the calibration region in a form of rectangle or a search window (column 7, lines 5-55; column 15, lines 13-58), wherein tracking data, to track the selected gestures is selected from one of the calculation region and the search windows having a highest tracking probability. For example, Bradski teaches that the tracking data such as window location parameters are determined/adjusted and a search window having the largest connected region of a probability distribution and the greatest probability density is selected (column 6, lines 45-67; column 7, lines 55-67; column 8, lines 1-9; column 15, lines 13-58) and each of the adjacent test windows share at least one pixel with the calibration rectangle (e.g., column 7, lines 5-55; column 15, lines 13-58).

Bradski further discloses a Gaussian or Chi-Square hue probability distribution which involves the mean hue or the standard deviation of the hue and search for the area with the greatest probability density involves the motion-tracking processing suggesting the mean hue or

the standard deviation of the hue being less than predetermined levels wherein the small mean saturation and a small standard deviation of a saturation or hue of the pixels in a Gaussian or Chi-Square probability density results in the optimum tracking accuracy (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 1-63, and column 6, lines 22-44; column 8, lines 10-38; column 12, lines 1-67). Therefore, Bradski teaches the claim limitation which is related to the selection of a test HSV array of pixels by comparing the hue and saturation mean and standard deviations with the predetermined parameter values.

It would have been obvious to one of ordinary skill in the art to have used the mean and standard deviation of the hue or saturation to obtain the optimum tracking accuracy because Bradski teaches performing pattern recognition based on Gaussian and Chi-square distributions to determine a best match for the tracked object because such a selection of optimum ranges yields the best match tracking object.

One having the ordinary skill in the art would have been motivated to do this because it would have provided a routine experimentation of the optimum ranges and criteria based on some specific parameters of the probability distributions to obtain the greatest probability density for object selection to find the best match tracking object. See In re Peterson, 65 USPQ2d 1379 (CA FC 2003) and In re Geisler (CA FC) 43 USPQ2d 1362.

6. In Remarks, Applicant argues in essence with respect to claim 29 and similar claims that:

(B) "...the Bradski reference does not disclose, teach, or suggest 1) determining a mean hue of the initial test HSV array of pixels if the standard deviation of the saturation of the initial test HSV array of pixels is less than the first predetermined amount, and 2)

determining a standard deviation of hue of the initial test HSV array of pixels if the mean hue of the initial HSV array of pixels falls within a second predetermined range."

In response to the arguments in (B), the Examiner asserts that Bradski at least suggests the claim limitation.

Bradski teaches a standard mean shift method to track objects that have been converted into probability distributions to determine if the search was moved by a value less than a preset threshould value (column 4-5). Bradski teaches determining window sizing parameters for a set of search windows or boxes or windows of FIG. 14A displaying images (column 5, lines 52-67; column 6, lines 1-44; column 15, lines 13-58), each of the moving search windows having a same shape and a same pixel size (e.g., column 7; column 14-15) as the calibration region in a form of rectangle or a search window (column 7, lines 5-55; column 15, lines 13-58), wherein tracking data, to track the selected gestures is selected from one of the calculation region and the search windows having a highest tracking probability. For example, Bradski teaches that the tracking data such as window location parameters are determined/adjusted and a search window having the largest connected region of a probability distribution and the greatest probability density is selected (column 6, lines 45-67; column 7, lines 55-67; column 8, lines 1-9; column 15, lines 13-58) and each of the adjacent test windows share at least one pixel with the calibration rectangle (e.g., column 7, lines 5-55; column 15, lines 13-58).

Bradski further discloses a Gaussian or Chi-Square hue probability distribution which involves the mean hue or the standard deviation of the hue and search for the area with the greatest probability density involves the motion-tracking processing suggesting the mean hue or

the standard deviation of the hue being less than predetermined levels wherein the small mean saturation and a small standard deviation of a saturation or hue of the pixels in a Gaussian or Chi-Square probability density results in the optimum tracking accuracy (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 1-63, and column 6, lines 22-44; column 8, lines 10-38; column 12, lines 1-67). Therefore, Bradski teaches the claim limitation which is related to the selection of a test HSV array of pixels by comparing the hue and saturation mean and standard deviations with the predetermined parameter values.

It would have been obvious to one of ordinary skill in the art to have used the mean and standard deviation of the hue or saturation to obtain the optimum tracking accuracy because Bradski teaches performing pattern recognition based on Gaussian and Chi-square distributions to determine a best match for the tracked object because such a selection of optimum ranges yields the best match tracking object.

One having the ordinary skill in the art would have been motivated to do this because it would have provided a routine experimentation of the optimum ranges and criteria based on some specific parameters of the probability distributions to obtain the greatest probability density for object selection to find the best match tracking object. See In re Peterson, 65 USPQ2d 1379 (CA FC 2003) and In re Geisler (CA FC) 43 USPQ2d 1362.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213. The examiner can normally be reached on 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6606 for regular communications and (703) 308-6606 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 395-3900.

jcw
December 17, 2004

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
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